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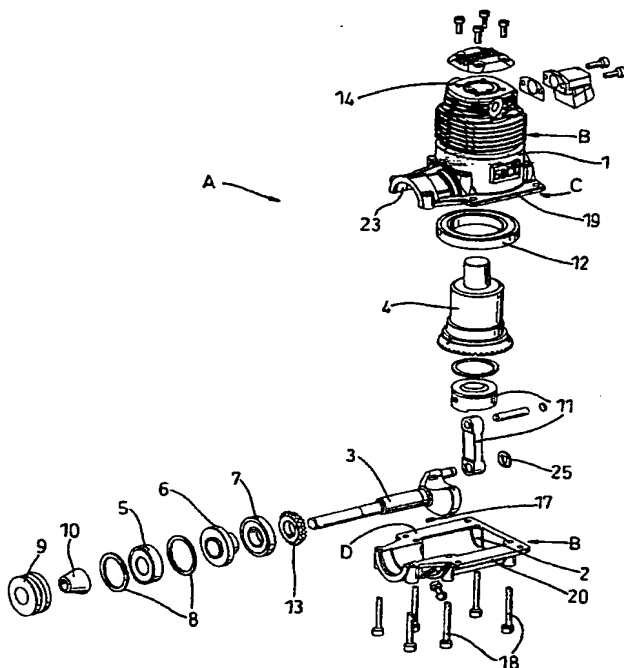
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(54) Title: **ENGINE AND CRANK HOUSING**



(57) Abstract: A housing assembly (B) for a rotating cylinder valve engine (A) comprising a rotary cylinder (4) and a crank assembly, comprises a first casing part (1) and a second casing part (2) each formed with a respective jointing face (C, D), the first casing part (1) being formed with a tubular bore adapted to receive the rotary cylinder (4) and being formed to partially house the crank assembly and the second casing part (2) being formed to partially house the crank assembly. The housing assembly (B) further comprises a tubular portion for housing bearing means (5, 7) for the crankshaft assembly, the tubular portion being defined by a semi-cylindrical section formed on the first casing part (1) and a semi-cylindrical section formed on the second casing part (2). The arrangement is such that in the assembled state the respective jointing faces (C, D) are in contact with each other, apart from any gasket therebetween, the plane of the jointing faces (C, D) being substantially perpendicular to the axis of rotation of the rotary cylinder (4), the tubular portion locating and retaining the bearing means (5, 7) for the crankshaft assembly.

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cylindrical section recess in the first casing part with a crankshaft gear meshed with a rotating cylinder gear at the correct timing point; and then fastening the second casing part to the first casing part to locate and retain the crankshaft bearings.

- 5 Alternatively, there is provided a method of assembling a rotating cylinder valve engine comprising a housing assembly according to the second aspect of the invention, the method comprising introducing the rotating cylinder into the tubular bore of the first casing part; then placing the crankshaft assembly the semi-cylindrical section recess in the
10 second casing part; then fastening an inner bearing cap to the second casing part to locate and retain the inner crank bearing; then holding the crankshaft and rotating cylinder in position to ensure that when the gears mesh the engine will be correctly timed; then inserting the piston and conrod assembly into the rotating cylinder; then fastening the second
15 casing part to the first casing part to locate and retain the remaining outer crankshaft bearings.

The invention may include any combination of the features or limitations referred to herein.

- The present invention may be carried into practice in various ways, but
20 three embodiments will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows an exploded view of an engine and crankcase assembly according to a first embodiment of the present invention;

- Figure 2 shows a cross section of the engine and crankcase
25 assembly, shown in Figure 1, in an assembled state; and

Figure 3 shows a cross section of an engine and crankcase assembly according to a second embodiment of the present invention.

Rotating cylinder valve engines are known to the skilled person in the art. Rotating cylinder valve engines generally comprise a rotating
5 cylinder wall and a reciprocating piston the linear motion of the reciprocating piston is converted into the rotation of the cylinder wall. The rotation of the wall is utilised for the opening and closing of the inlet and outlet ports of the engine.

An example of a rotating cylinder valve engine is described in
10 specification of PCT patent application no. PCT/GB97/01934 in the name of RCV Engines Limited. The specification describes a rotating cylinder engine for a model aircraft. However, the skilled person in the art will realise that the engine described in this document may be adapted for many different applications.

15 By way of explanation of the present invention there follows with reference to Figures 1 and 2 a procedure for manufacturing and assembling a rotating cylinder valve engine according to a first embodiment of the present invention.

A rotating cylinder valve engine 'A' comprises a combined housing 'B'.
20 The combined housing 'B' comprises an upper casing part 1 and lower casing part 2.

The upper casing part 1 comprises an upper mounting flange 19 that is formed with a jointing face 'C' and the lower casing part 2 comprises a lower mounting flange 20 that is formed with a jointing face 'D'. In the
25 assembled state the upper mounting flange 19 and the lower mounting flange 20 combine to form a full depth mounting lug.

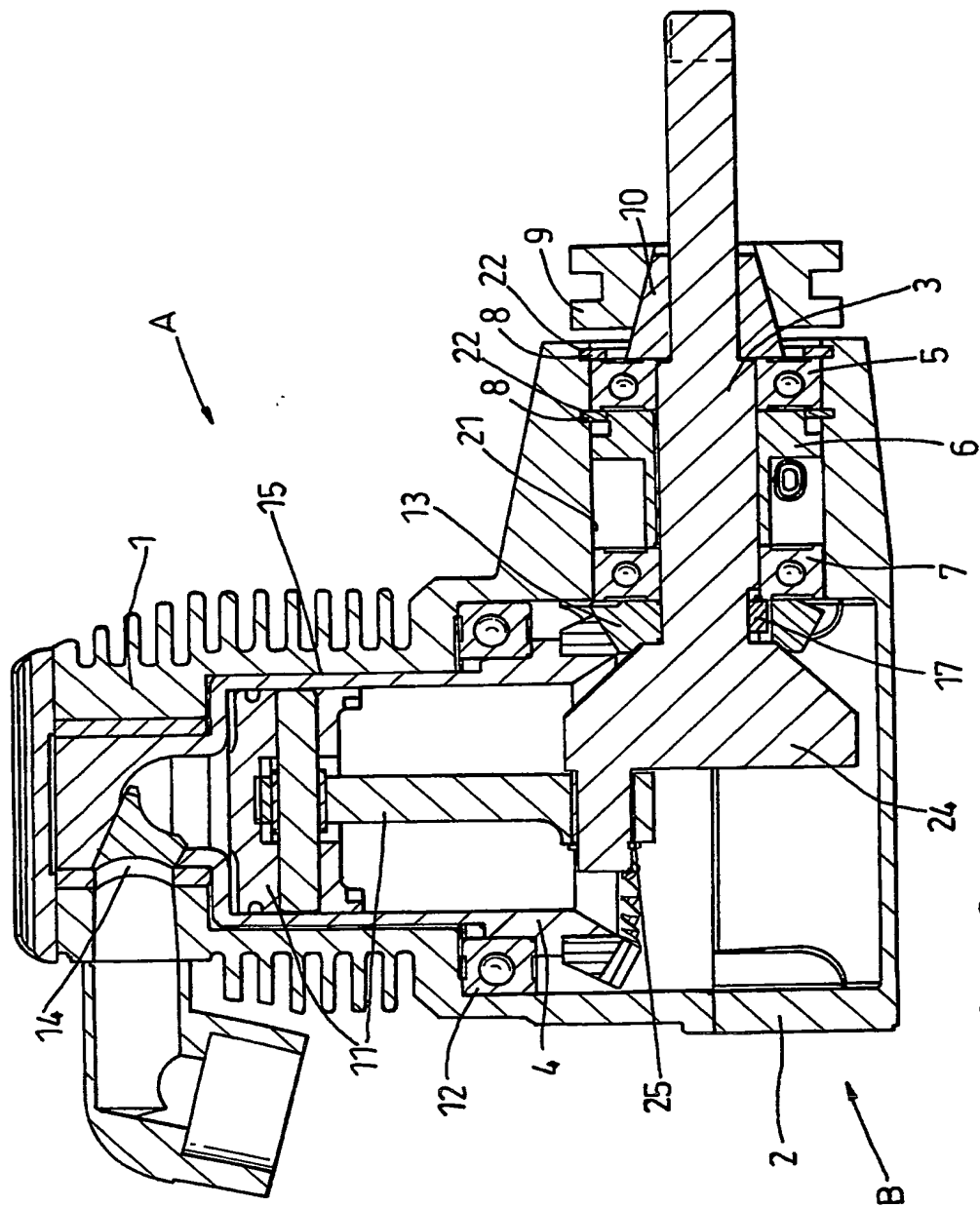


Fig. 2

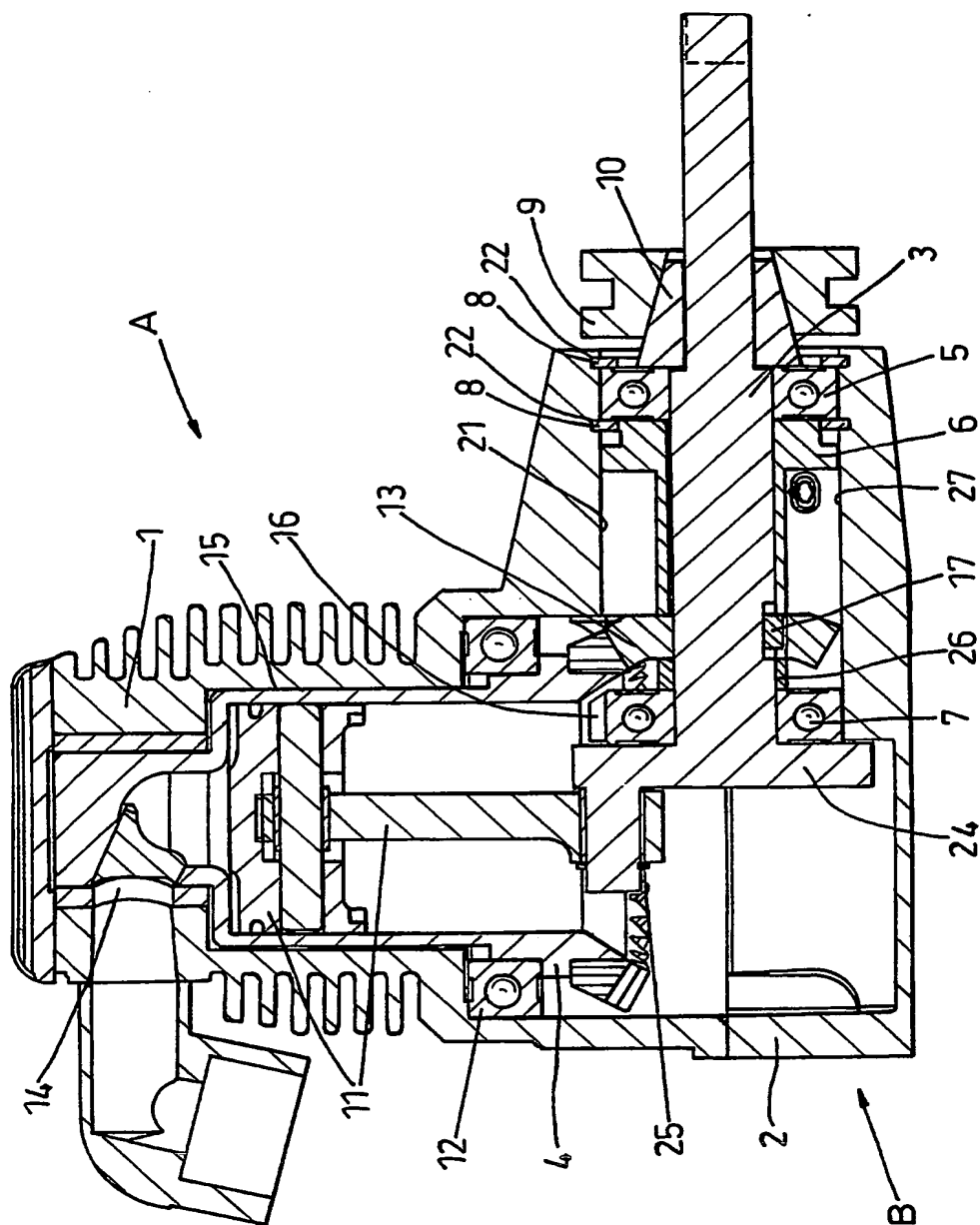


Fig. 3

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER IPC 7 F02B75/34 F01L7/04		
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B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 F02B F01L		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 644 319 A (FIN GEF SRL) 22 March 1995 (1995-03-22) the whole document	1
A	US 3 561 416 A (KIEKHAEFER ELMER C) 9 February 1971 (1971-02-09) column 2, line 1 - line 5; figures 1,3	1
A	DE 28 22 651 A (HABSBURG LOTHRINGEN LEOPOLD VO) 29 November 1979 (1979-11-29) claim 1; figures	1
A	DE 27 14 351 A (DYLLA NORBERT) 5 October 1978 (1978-10-05) claim 1; figures	1
<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016		Authorized officer Mouton, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0644319	A	22-03-1995	IT 1264947 B1	17-10-1996
			CA 2127418 A1	20-01-1995
			EP 0644319 A1	22-03-1995
			JP 7180558 A	18-07-1995
			US 5482011 A	09-01-1996
US 3561416	A	09-02-1971	NONE	
DE 2822651	A	29-11-1979	DE 2822651 A1	29-11-1979
DE 2714351	A	05-10-1978	DE 2714351 A1	05-10-1978